Method and apparatus for loading a fibrous stock suspension

Patent Claims

1. Method for loading a fibrous stock suspension (1) containing chemical pulp fibers with calcium carbonate, comprising the following process steps:
   - Adding calcium hydroxide in liquid or dry form, or calcium oxide into the fibrous stock suspension (1),
   - Feeding of a flue gas (3) which contains carbon dioxides into the fibrous stock suspension (1),
   - Precipitation of calcium carbonate through the carbon dioxide which is contained in the flue gas (3) and
   - Removal of the superfluous flue gas (3) after the loading process.

2. Method according to claim 1,
   characterized in that
   the flue gas (3) is added into the fibrous stock suspension (1) having a carbon dioxide content of between 2 and 30%.

3. Method according to claim 1 or 2,
   characterized in that
   a refining force in the range of between 0.1 and 300 kWh per ton of dry fiber stock is applied, whereby the loading process and the refining process are accomplished in an apparatus (42).

4. Method in accordance with claim 1 through 3,
   characterized in that
   aqueous fibrous stock material, especially aqueous fiber stock having a consistency of 0.1 to 20%, preferably between 2 and 6% is used as primary raw material.

5. Method in accordance with claim 4,
characterized in that
the calcium hydroxide is added through a static mixer (16) or through an intermediate tank.

6. Method in accordance with one of the claims 1 through 5 ,
characterized in that
a static mixer, a refiner (80), a disperger and/or a fluffer FLPCC reactor are utilized as a reactor, whereby the fibrous stock content, especially the fiber content is between 0.01 and 15% in the instance of a static mixer; at between 2 and 40% in the instance of a refiner and a disperger and between 15 and 60% in the instance of a fluffer-FLPCC-reactor.

7. Method in accordance with one of the claims 1 through 6,
characterized in that
the dilution water is added prior to, during or after the addition of carbon dioxide or calcium hydroxide or calcium oxide.

8. Method in accordance with one of the claims 1 through 7
characterized in that
an expenditure of energy of between 0.3 and 8 kWh/t, especially between 0.5 and 4 kWh/t is used for the precipitation reaction.

9. Method in accordance with one of the claims 1 through 8,
characterized in that
the process temperature is between -15 °C and 120 °C, especially between 20 and 90 °C.

10. Method in accordance with one of the claims 1 through 9,

characterized in that

rhombohedral, scalenohedron and spherical crystals are produced.

11. Method in accordance with claim 10,

characterized in that

the crystals measure between 0.05 and 5 μm, especially between 0.3 and 2.5 μm.

12. Method in accordance with one of the claims 1 through 11,

characterized in that

static and/or moving, especially rotating mixing elements (68) are utilized.

13. Method in accordance with one of the claims 1 through 12,

characterized in that

it is carried out in a pressure range of between 0 and 15 bar, especially between 0 and 6 bar.

14. Method in accordance with one of the claims 1 through 13,

characterized in that

it is carried out at a ph value of between 6 and 10, especially between 6.5 and 8.5.

15. Method in accordance with one of the claims 1 through 14,

characterized in that

the reaction time is between 0.05 seconds and 1 minute, especially between 0.05 and 10 seconds.

16. Apparatus to execute a method in accordance with one of the claims 1 through 15,
characterized in that
it comprises an arrangement (2) of machines for loading the fiber stock suspension (1) with calcium carbonate and which can be supplied with carbon dioxide containing flue gas (3) and that a deaeration unit (6) for the removal of superfluous gas is located following the machines.

17. Apparatus in accordance with claim 16,
characterized in that
the flue gas (3) from an incineration plant can be supplied especially to a gas motor or a gas turbine.

18. Apparatus in accordance with claim 16 or 17,
characterized in that
the deaeration unit (6) preferably comprises a chest with an agitator, a pressure screen, a deaeration pump, a cyclone, a cleaner and/or a deculator.

19. Apparatus in accordance with one of the claims 16 through 18,
characterized in that
an intermediate tank (7) is installed after the deaeration unit (6), viewed in fiber stock (1) flow direction.